March 3, 1953 J. HAMILTON 2,629,995

HOSIERY PRODUCTION

Filed July 11, 1951 2 SHEETS—SHEET 1

FIG. 1.

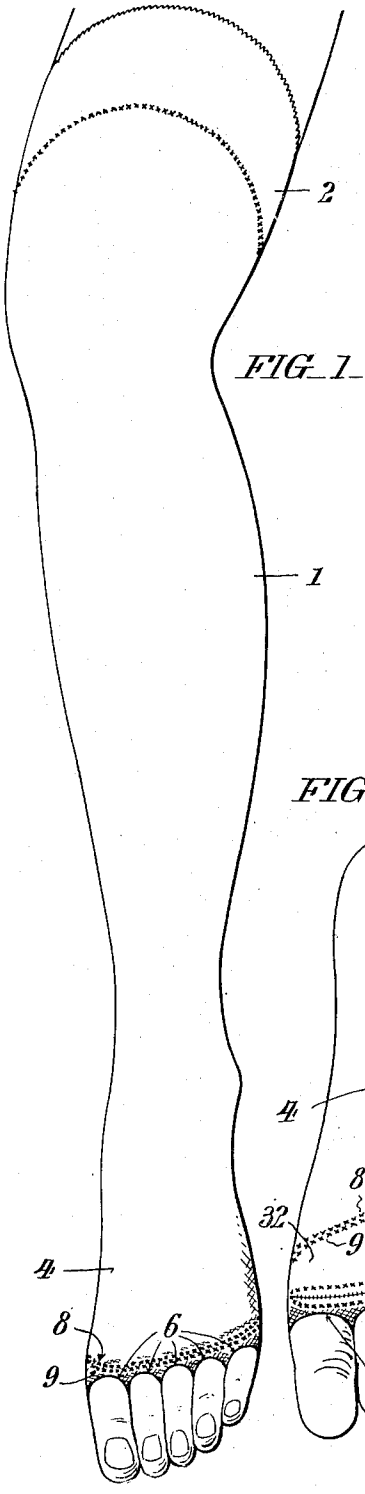


FIG. 6.

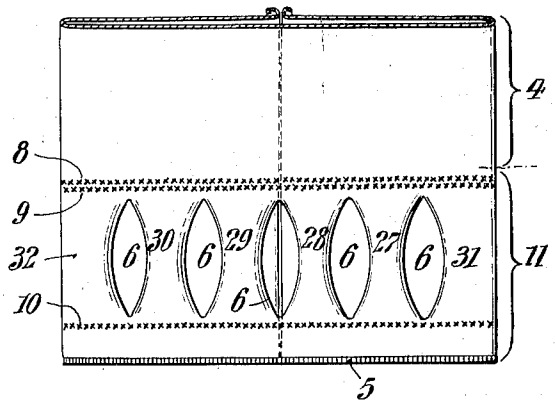


FIG. 7.

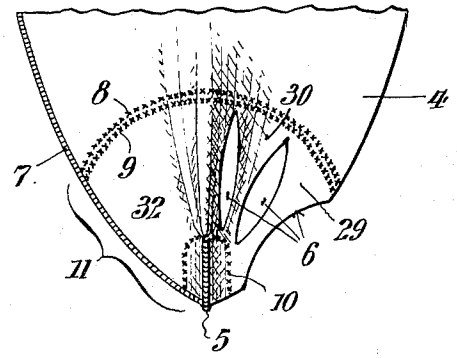
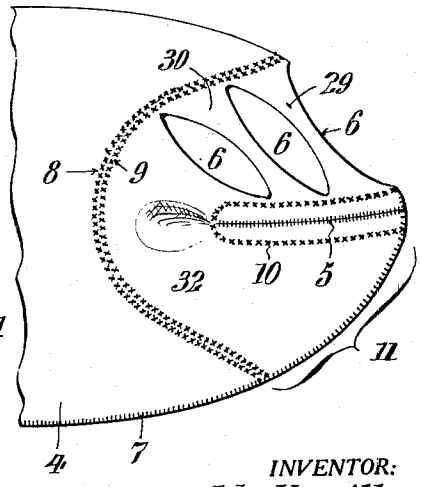


FIG. 2.

FIG. 3.



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Filed July 11, 1951 2 SHEETS--SHEET 2

FIG. 4

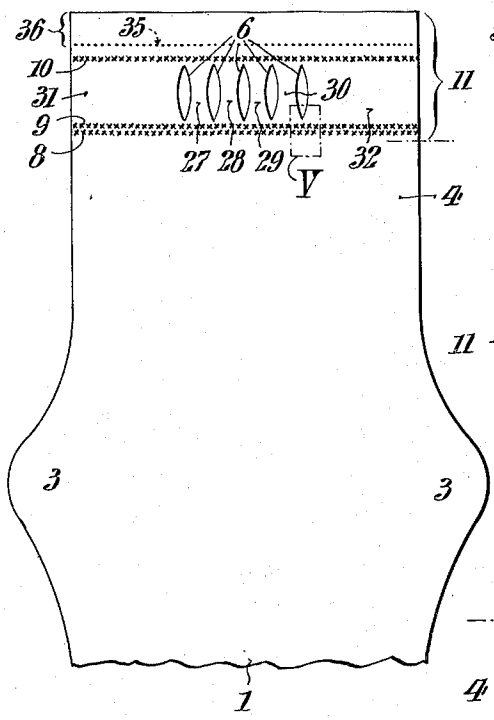


FIG. 5

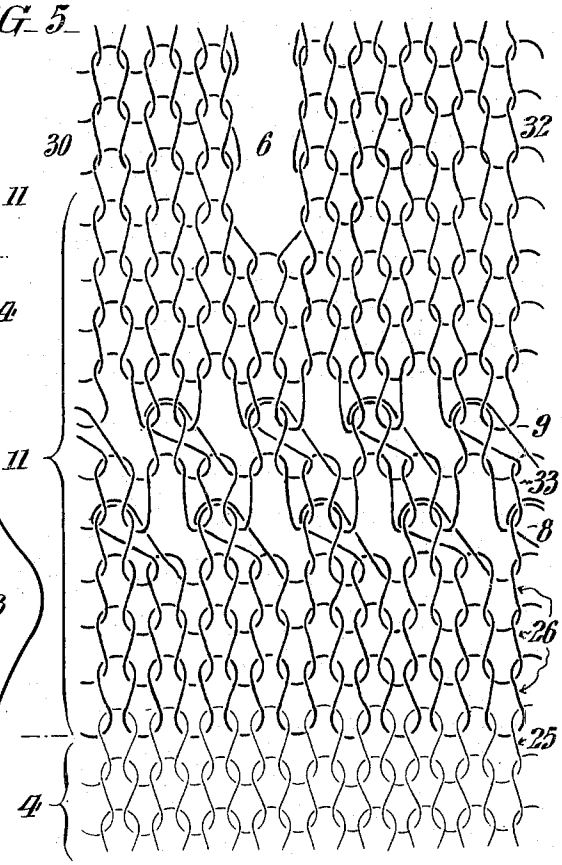
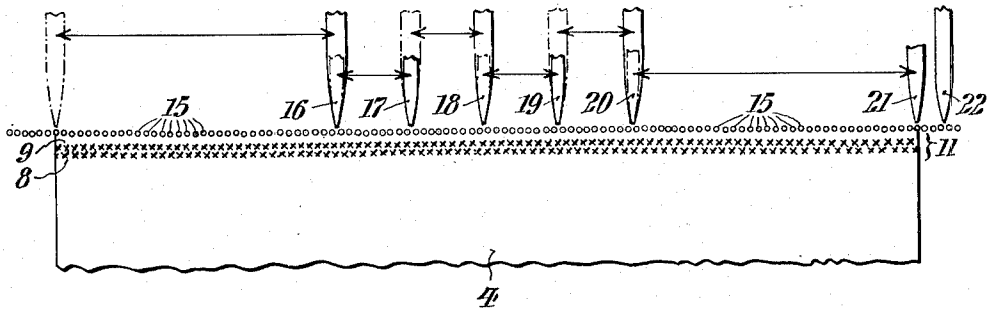


FIG. 8



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Patented Mar. 3, 1953 2,629,995

UNITED STATES PATENT OFFICE

2,629,995

HOSIERY PRODUCTION

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Application July 11, 1951, Serial No. 236,141

11 Claims. (Cl. 66—128)

1

This invention relates to hosiery production. More particularly, it is concerned with production of fashioned stockings of the toe-less type such as disclosed in U. S. Patent 2,424,056 granted to Marjorie I. Ruth on July 15, 1947, having frontally closed foot portions with laterally adjacent holes for protrusion through them of the wearer's toes.

The chief aim of my invention is to make it possible to produce such stockings commercially at minimum cost both from the standpoints of expenditure for material and for labor. This objective is realized as hereinafter more fully set forth, by first producing on a standard straight knitting machine with a series of needles and a plurality of reciprocable carriers, a continuously knitted selvage-edged blank having a fashioned leg and heel portion and a fore-shortened instep portion formed for the most part from a fine gauge yarn, except for an end zone in which the toe holes are involved, said end zone being formed from heavier or reinforcing yarns individually fed from others of the carriers of which the traverse is restricted so that their respective yarns are fed to adjacent groups of needles in such manner as to form selvage-edged walewise fabric segments between slits that serve as the toe holes. The finished stocking is produced by first folding the end of the foot portion of the blank in a prescribed manner and looping together superposed edge portions of the terminal course of the web, and thereafter seaming together the longitudinal selvages of the blank from the looped juncture to the top of the stocking.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein: Fig. 1 is a perspective view showing a toe-less stocking, produced in accordance with my invention, as it appears on the leg of the wearer.

Fig. 2 shows the foot bottom of the stocking.

Fig. 3 is a fragmentary view showing the apertured end of the stocking foot as seen from one side.

Fig. 4 shows the foot portion of the flat knitted blank from which the stocking is formed.

Fig. 5 is a fragmentary view showing the construction of the fabric within the area bounded by the broken line rectangle V in Fig. 4.

Figs. 6 and 7 are fragmentary views respectively showing how the blank is folded during the looping of the foot end and during longitudinal seaming of the stocking; and

Fig. 8 is a diagrammatic view showing how the apertured end of the foot portion of the blank is formed on the knitting machine.

2

The stocking with the production of which my invention is concerned is claimed per se in a separate application Ser. No. 236,126, concurrently filed herewith, and is herein illustrated, by way of example in Figs. 1–3, as being of the full length fashioned variety having a leg portion 1 with a welt 2 at the top, a foot with a conventional heel 3 and an instep portion 4. As shown, the foot is fore-shortened and closed at the front end by a crosswise seam 5 and provided moreover with a transverse row of apertures or openings 6 for protrusion of the toes of the wearer, the stocking being in this instance seamed as at 7 longitudinally of the foot bottom and upward of the back of the leg, and being continuously knitted as a unitary structure. The stocking is further characterized by having, immediately above and below the apertured zone, lock stitch barrier courses, there being two such courses 8 and 9 in contiguous relation above said apertured zone, and but one such course 10 below said zone. As will be seen later, the leg 1, the heel 3 and the advance instep portion 4 of the stocking are knitted from a yarn of fine gauge, while the foot end zone 11, in which the apertures 6 and the barrier courses 8–10 are involved, is knitted from a heavier reinforcing yarn.

The blank of Fig. 4 for the stocking may be produced, in accordance with my invention, on any standard full-fashioned stocking knitting machine having, as conventionally shown in Fig. 8, a straight row of needles 15 and seven reciprocable yarn carriers 16, 17, 18, 19, 20, 21 and 22. As later pointed out, the carrier 22 is employed as a feed for a light gauge yarn in knitting the leg, heel and instep portions 1, 3 and 4 of the blank, and the carriers 16—21 as feeds for individual heavier yarns all of the same count in knitting the apertured zone 11 of the foot. Knitting of the leg, heel and instep portions may be carried out to course 25, in any of the well known ways commonly practiced in the art, from the yarn served by carrier 22. After the knitting of course 25, carrier 22 is removed from action and one of the other carriers, say the carrier 21, used to form a few full instep width plain courses 26 from the heavier yarn (see Fig. 5), whereupon the picot bar (not illustrated) with which such machines are ordinarily equipped, is actuated to laterally transfer fabric loops from alternate needles to adjacent needles to double them with the loops already on the latter needles, and thereby form the barrier course 8. Then, after knit-

ting a plain course 33, another barrier course 9 is formed likewise with the aid of the picot bar. At this stage, the carriers 16—21 are shifted to the active positions in which they are shown in Fig. 8, and the usual stops (not illustrated) therefor adjusted to restrict the traverse of said carriers within the limits indicated by the double headed arrows, so that their yarns are fed to corresponding groups of the needles as the knitting proceeds. As a result, four wale-wise selvage-edged fabric segments 27, 28, 29 and 30 are formed together with two end segments 31 and 32 with slits between adjacent selvages. After slits of sufficient length to serve for the toe apertures or holes 6 are formed, the carriers 16—20 are removed from action, and the carrier 21 alone is used to knit a short length of plain fabric, whereupon the picot bar is once more brought into action to form the single barrier course 10. It is to be noted that the end fabric segments 31 and 32 are made wider than the intermediate segments 27—30 so as to constitute portions of the foot sole of the stocking after the latter is looped and seamed in the manner presently described. With the foregoing accomplished, another short length of fabric is knitted from yarn fed by carrier 21, then a loose course 35, and finally a plurality of looper's rounds 36, whereupon the completed blank is pressed off from the needles 15 of the machine.

To finish the stocking, the front end of the foot portion of the blank is folded to bring the outer edge selvages into abutting relation medially of the bottom of the instep as in Fig. 6, and the superposed lengths of the loose course 35 (Fig. 4) are then united as at 5 by means of a conventional looping machine, and finally the superposed longitudinal selvages of the web seamed together as at 7 by running them through a cup feed or other suitable type of sewing machine after common practice in the art of full-fashioned stocking production.

My invention is not to be construed as restricted to the production of full length hosiery, since it is equally applicable to knee length stockings, and anklets or socks, or even in connection with the production of so called "footees" or stocking feet alone, as will be readily understood by those skilled in the knitting art.

Having thus described my invention, I claim:

1. The method of producing a toe-less stocking, comprising the steps of knitting a leg and a heel portion and a fore-shortened instep portion; then knitting in continuation a plurality of transversely - aligned selvage - edged wale - wise continuations with intervening slits to serve as the toe holes; then knitting in continuation a few full completing courses; and then flattening the blank thus formed and uniting the superposed portions of the terminal course.

2. The method of producing a toe-less stocking according to claim 1, including the further intermediate steps of forming lock stitch barrier courses immediately before and immediately after knitting the zone in which the slits are involved.

3. The method of producing a toe-less stocking according to claim 2, by employing a light gauge yarn in knitting the leg, the heel and advance instep; and by knitting the slitted zone with reinforcing yarn of heavier gauge.

4. The method of producing a toe-less stocking according to claim 1, by employing a light gauge yarn in knitting the leg, the heel and the advance instep; and by knitting the slitted end zone with reinforcing yarn of heavier gauge.

5. The method of producing a flat selvaged blank for a toe-less stocking on a knitting machine having a straight series of needles and at least seven reciprocatable yarn carriers, said method comprising the steps of knitting a fashioned leg and a heel portion, and then a definite length of parallel-edged advance instep fabric all from yarn fed by one of the carriers; then withdrawing said one carrier and employing the other six carriers concurrently for a time and limiting their traverse for feeding of their respective yarns to separate adjacent groups of the needles to form continuing slit-separated selvage edged fabric sections; then withdrawing all but one of said six yarn carriers and knitting several full courses on the needles in continuation of the instep from yarn fed by the retained carrier; and finally pressing off the completed blank from the needles.

6. The method defined in claim 5, including the further intermediate steps of forming a barrier course of laterally-transferred and doubled loops immediately before the segmental knitting, and forming another barrier course immediately after the segmental knitting.

7. The method of finishing a toe-less stocking from a blank formed in accordance with claim 5, which comprises the steps of folding the front end of the foot portion of the blank to bring the outer side edge selvages of the blank into abutting relation medially of the bottom of the instep; looping together the superposed crosswise edge portions of the terminal course of the foot; and finally seaming together the outer selvages of the blank from the looped juncture to the top of the blank.

8. The method of producing a toe-less stocking foot which comprises the steps of forming, after an instep portion has been knitted, a plurality of selvage-edged wale-wise continuations with intervening slits to serve as toe holes; then knitting in continuation a few completing courses; and then flattening the resulting blank and uniting the superposed portions of the terminal course.

9. The method of producing a toe-less stocking foot according to claim 8, including the further intermediate steps of forming lock stitch barrier courses immediately before and immediately after knitting the zone in which the slits are involved.

10. The method of producing a toe-less stocking according to claim 9, by employing a light gauge yarn in knitting the instep portion; and by knitting the slitted zone with reinforcing yarn of heavier gauge.

11. The method of producing a toe-less stocking foot according to claim 8, by employing a light gauge yarn in knitting the instep portion; and by knitting the slitted zone with reinforcing yarn of heavier gauge.

JOHN HAMILTON.

REFERENCES CITED

The following references are of record in the file of this patent:

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2,424,056	Ruth	July 15, 1947

FOREIGN PATENTS

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